



A.D. 1854 N° 2594.

S P E C I F I C A T I O N

OF

NATHANIEL JOHNSTON.

—
BREEDING, REARING, AND CARRYING
LEECHES.
—

L O N D O N :

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A.D. 1854 N° 2594.

Breeding, Rearing, and Carrying Leeches.

LETTERS PATENT to Nathaniel Johnston, of Bordeaux, at present in Paris, Merchant, for the Invention of “**IMPROVEMENTS IN ARRANGING BUILDINGS AND APPARATUS FOR BREEDING, REARING, PRESERVING, AND CARRYING LEECHES.**”
—A communication.

Sealed the 6th February 1855, and dated the 9th December 1854.

PROVISIONAL SPECIFICATION left by the said Nathaniel Johnston at the Office of the Commissioners of Patents, with his Petition, on the 9th December 1854.

I, NATHANIEL JOHNSTON, of Bordeaux, at present in Paris, Merchant, do
5 hereby declare the nature of the Invention for “**IMPROVEMENTS IN ARRANGING BUILDINGS AND APPARATUS FOR BREEDING, REARING, PRESERVING, AND CARRYING LEECHES,**” to be as follows :—

It has heretofore been the practise when breeding and rearing leeches to have recourse to open marshes, which are necessarily subject to the prejudicial
10 consequences of varying temperatures, and there is also, by reason of want of protection, much loss by the depredations of rats and other animals. Now, the object of this Invention is to change the system of breeding and rearing of leeches from what may be called a natural to an artificial system, by which the breeding and rearing of leeches will be rendered more advantageous by
15 reason of the faster growth and more early maturity of the leeches.

The rearing of leeches will also be more under control, and they will be more accessible to the rearer ; hence, leeches of different ages and states of

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being as to health and otherwise may be more readily kept in separate classes than could heretofore be done, and this will admit of different treatment to the different classes of leeches, which is found to be of great importance; and by reason of the protection offered by the use of buildings and apparatus against the ravages of rats and other animals, and the more quick breeding, the 5 quantities raised in a given time will be very largely increased.

Leeches may also, by using more suitable apparatus than heretofore, be conveyed to great distances, and be kept packed for much longer periods with much less loss than heretofore. For these purposes, in place of having recourse to marshes in the open air, as heretofore, marshes are enclosed or formed in 10 buildings, arranged in such manner as to be light and airy, and so as to be heated by means of steam or hot water pipes, or by other artificial means, to maintain the various parts of the interior of the building at such temperatures as are found most suitable for the different stages of growth, and also the different states of being, of the leeches at different periods. These artificial marshes 15 are formed on peat or bog earth, and aquatic and other plants are provided. In these marshes inverted pots or vessels (by preference of a conical form and of earthenware, though other materials may be used,) are placed in series and ranges, some being full of water, others being partly full, and others for the most part dry, the leeches being at liberty to occupy either, according as 20 their own feelings may dictate; and such pots or vessels have packed therein aquatic and other plants and roots and dry matters, amongst which the leeches enter. By these arrangements each pot or vessel can readily be emptied out, and the leeches examined from time to time, and those of different growth and ages may thus be more readily separated and be kept in classes, and the 25 nourishing and feeding of the leeches may be distinct, one class from another, thus avoiding the objectionable and prejudicial consequences of giving the same opportunities of obtaining nourishment to quantities of leeches mixed together of different growth and ages. By these means also may quantities of matured leeches be kept at all times ready for use, the feeding being readily 30 regulated. The leeches thus housed and protected will also for the most part, if not wholly, be protected from the ravages of rats and other animals; and by the employment of vessels, each with a central tube perforated at its lower end, and filled with peat or bog earth, aquatic and other plants, roots, and dry matters, with a few inches of water at the bottom, and with wire cloth at the 35 top, leeches may be transported to great distances, and preserved for a great length of time, the leeches having been previously fed with reference to the length of time before they will be required for use.

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SPECIFICATION in pursuance of the conditions of the Letters Patent, filed by the said Nathaniel Johnston in the Great Seal Patent Office on the 8th June 1855.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, NATHANIEL
5 **JOHNSTON**, of Bordeaux, Merchant, send greeting.

WHEREAS Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Ninth day of December, in the year of our Lord One thousand eight hundred and fifty-four, in the eighteenth year of Her reign, did, for Herself, Her heirs and successors, give and grant unto me, the
10 said Nathaniel Johnston, Her special licence that I, the said Nathaniel Johnston, my executors, administrators, and assigns, or such others as I, the said Nathaniel Johnston, my executors, administrators, and assigns, should at any time agree with, and no others, from time to time and at all times thereafter during the term therein expressed, should and lawfully might make, use,
15 exercise, and vend, within the United Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man, an Invention for “**IMPROVEMENTS IN ARRANGING BUILDINGS AND APPARATUS FOR BREEDING, REARING, PRESERVING, AND CARRYING LEECHES,**” (a communication,) upon the condition (amongst others) that I, the said Nathaniel Johnston, by an instrument in writing under my hand
20 and seal, should particularly describe and ascertain the nature of the said Invention, and in what manner the same was to be performed, and cause the same to be filed in the Great Seal Patent Office within six calendar months next and immediately after the date of the said Letters Patent.

NOW KNOW YE, that I, the said Nathaniel Johnston, do hereby declare the
25 nature of the said Invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement thereof (that is to say) :—

It has heretofore been the practise when breeding and rearing leeches to have recourse to open marshes, which are necessarily subject to the prejudicial
30 consequences of varying temperatures, and there is also by reason of want of protection much loss by theft, by the depredations of rats and other animals. Now, the object of this Invention is to change the system of breeding and rearing of leeches from what may be called a natural to an artificial system, by which the breeding and rearing of leeches will be rendered more advantageous
35 by reason of the faster growth and more early maturity of the leeches. The rearing of leeches will also be more under control, and they will be more accessible to the rearer ; hence, leeches of different ages and states of being, as to health and otherwise, may be more readily kept in separate classes than

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could heretofore be done, and this will admit of different treatment to the different classes of leeches, which is found to be of great importance; and by reason of the protection offered by the use of buildings and apparatus against theft, the ravages of rats and other animals, and the more quick breeding, the quantities raised in a given time will be very largely increased. For these pur- 5
poses, in place of having recourse to marshes in the open air, as heretofore, buildings termed “hirudinieres” are arranged in such manner as to be light and airy, and so as to be heated by means of steam or hot water pipes, or by other artificial means, to maintain the various parts of the interior of the building at such temperatures as are found most suitable for the different stages of growth, and 10
also the different states of being, of the leeches at different periods. In these buildings are placed troughs, in wood or stone, or other material, which may be of various shapes, lengths, and depths, intended to contain water, in which are placed vases, pots, or cases, which may be of various shapes, and made of various materials; conical forms of porous earthenware with or without small 15
holes or apertures at their lower ends are preferred for general purposes, though those of different materials might be usefully adopted. Sufficient water is put into the troughs to cover about one-third of each of the vases, pots, or cases which are placed in them. By these means these vessels are kept with their lower ends to about one-third of their total height in water, 20
the other two-thirds out of water. Into these vases, pots, or cases is put a certain quantity of earth of a suitable quality, by preference that extracted from marshes, on the top of which earth aquatic plants, dry or green, are put. Into these vases containing the said earth and plants the leeches are put, the quantities varying according to the size of the vessels and of the leeches them- 25
selves. A perforated top, either of metal, wire, or wood, is placed on these vessels to prevent the leeches getting out. From the circumstances of the vessels being made of porous materials, or being perforated to the height to which they are placed in water, the lower portion of the earth contained in them is kept constantly wet, the part immediately above the watermark is less 30
so, and the moisture gradually diminishes up to the surface, thus affording the leeches the opportunity of seeking the degree of wet or damp most suitable to their taste, and to their momentary state of health. By these arrangements, each pot or vessel can readily be emptied out, and the leeches examined from time to time, and those of different growth and ages may thus be more readily 35
separated, and be kept in classes, and the nourishing and feeding of the leeches may be distinct one class from another, thus avoiding the objectionable and prejudicial consequences of giving the same opportunities of obtaining nourishment to quantities of leeches mixed together of different growth and ages.

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By these means also may quantities of matured leeches be kept at all times ready for use, the feeding being readily regulated. The leeches thus reared may afterwards be kept in vessels covered with wire cloth, each with a central tube, porous or perforated at the lower end. Into these vessels the leeches are
5 put, after having filled the vessels nearly with earth and aquatic plants, in the same manner as has been described for the vases or pots in the "hirudiniere." Through the central tube, which is perforated or porous at the lower end, water is introduced from time to time at the lower portions of the earth, thus keeping that portion constantly wet, and allowing the moisture to diminish
10 towards the surface, for the same purpose as has been described for the vases or pots in the "hirudiniere." Leeches may also in such vessels be conveyed to great distances, and be kept packed for much longer periods with much less loss than heretofore. The leeches, when to be conveyed to a distance in apparatus as above described, are to be previously fed with reference to the length
15 of time before they will be required for use.

Having thus stated the nature of the said Invention, I will proceed to describe an arrangement of building and apparatus constructed and combined according to the Invention. I would, however, state that the form of the building and the arrangement of earthenware pots and apparatus used therein
20 may be greatly varied.

DESCRIPTION OF THE DRAWING.

Figure 1, side front: A, stables for cattle; B, separating wall; C, wall higher than the ground; D, glazing; E, timber work; F, doors of ingress or outgress. Figure 2, front facing south: A, glazed partition forming a hot-
25 house; B, roofing in zinc, tiles, or slates; C, wall above ground; D, piles bearing the timber work and glazing. Figure 3, principal part of the building: A, stables for cattle; B, separating wall; C, wall above ground; F, round wooden troughs to contain the vases, pots, or cases with earth in them. These round wooden troughs may be replaced by long wooden or stone troughs,
30 running uninterruptedly or not the whole length of the interior of the building, right and left of the passage between the points E, E, or in any other position; these troughs to have sufficient water in them to come to about one-third more or less of the length of the vases, pots, or cases which are to be placed in them. The earthenware vessels are of a conical shape, and filled with soil of the
35 marshes. The conical vessels at their upper parts are above the level of the water, and have perforations at the lower ends, unless made of porous earthenware, to enable the water in the troughs to enter. G is what is called the aquarium. The long square in red lines is hollowed in the ground to the depth

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of about 39 inches, and is full of marshy soil, where aquatic herbs are cultivated, and where water can be let in according as it may be wanted. The black lines represent deal shelves, one over the other, at about 13 inches distance; on these shelves is placed a layer of "sphagnum," on which the "cocons" are deposited, and where the young leeches are born. The "filets" or small leeches, as they quit their envelope, fall or are thrown into the aquarium, where they disperse themselves among the plants. Living animals (generally horses) are then brought into the aquarium, in number according to the dimensions of the place, to give to the leeches their first nourishment, and when the leeches can be caught by hand, they are put into the earthenware vessels already described, and are then to be nourished in what may be called local baths. These baths consist of tubes of india-rubber, gutta percha, or of linen or other cloth made waterproof; which, after having been drawn on to the legs of the horses or other animals, are tied at the lower extremities round the animals' legs; the waterproof tubes are then filled with water, into which the leeches are thrown; the tubes are then to be tied at their upper ends, and the leeches are allowed to take their food by suction, which, taking place in water, is believed to give little or no pain to the animals; the leeches are then placed again in the said vessels until they have reached the required size, and gone through the purifying necessary for medical use. There are the pipes of a stove requisite to obtain a damp heat by having water trays on the upper surface; these pipes or flues may be heated by being connected with a fire-place or fire-places, and act as horizontal flues leading to the chimney, or they may be heated with hot water or steam. By these means, not only may an uniform temperature be maintained in the building, but humid atmosphere also, which greatly tend to advance the breeding and culture of leeches. In order to insure the obtaining and preservation of cocons, floating islands are placed in the common marshes in which leeches are usually bred, and this particularly when the height of water is liable to vary. These floating islands are composed of a grating or framing of wood, more or less open for the passage of the leeches. These frames are covered over with dried aquatic plants, earth, or other vegetable matters, which float for the most part above the water. The heat engendered by the vegetable matters on the rafts or floating islands as the lower parts become moistened and ferment is found advantageous. In constructing the buildings, care should be taken, either by paving or otherwise, to prevent as much as may be vermin, such as rats and others, getting into the building; the leeches being kept according to the different stages of growth in the earthenware, or it may be other pots or cells, (capable of being lifted separately and their contents examined.) The greatest facility is offered to the

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parties superintending in the building to observe the state of health and progress of the leeches, and this can be done with far greater ease and certainty than when numerous leeches in different stages of growth are in a marsh. The feeding and nourishing of the leeches may, by thus keeping them separate
5 in classes, be attended to with greater advantage than could be the case where leeches of different ages are mixed. The breeding and raising leeches, as it is ordinarily practised in natural marshes being well understood by leech growers, it will not be necessary to enter into any description of the manner of feeding or of general treatment further than to remark, that with the exception of the
10 greater and more exact separation of leeches into classes or ages, and the quicker maturity brought about by artificial warmth, as well as by the application of what I term the local bath, to the animal from which they get their food, the feeding and general treatment will be the same as before.

From the above description it will be seen that the Invention consists of
15 arranging and combining apparatus, and forming artificial marshes in buildings under cover, capable of being artificially heated and ventilated, by which the breeding, rearing, and maturing of leeches will be greatly improved, facilitated, and advanced, at the same time the leeches will be protected from the ravages of vermin and birds; and the Invention also consists of the means of keeping
20 and transporting leeches to any distance.

In witness whereof, I, the said Nathaniel Johnston, have hereunto set my hand and seal, this Twenty-ninth day of May, in the year of our Lord One thousand eight hundred and fifty-five.

NATHL. JOHNSTON. (L.S.)

25 Witness,

L. V. CLOSE, of Northallerton,
now resident in Bordeaux.

It having occurred unto me, the said Nathaniel Johnston, that in England, where the rearing of leeches is not generally understood, that further details
30 should be added to the Specification as to the course of treatment adopted from the birth of the leeches to their arrival at maturity, I have to subjoin the following information to what preceeds:—As soon as the building or hirudinière is complete, cocons should be obtained from natural marshes, to be placed, as has been already described, in the aquarium. Live animals are shortly afterwards
35 introduced, in order to give the leeches after their birth their first gorging. After this operation, the young leeches can be taken out of the aquarium and put into vases or pots, there to digest the food they have taken. Some three weeks or so afterwards their digestion will be sufficiently advanced to enable

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them to take a second gorging, which is effected by putting them in the local baths, already described, applied to the quadrupeds, from which they derive their sustenance. They are then replaced in the vases, pots, or cases to perform their second digestion, which is effected within a month or six weeks afterwards; then a third gorging in the same way is given them, after digesting which many 5 of the leeches will be arrived at a sufficient size to be sold; those that are not will require a fourth, and sometimes a fifth, gorging. The leeches, towards the summer months, that is, towards June & July, will commence making their “cocons” in the vessels, pots, or cases in which they are kept; they will at that period gradually come towards the surface of the earth in these pots, &c. in 10 order to avoid too great moisture. When the “cocons” are laid, they may be taken out of these vases, pots, or cases, & put into the aquarium, & the same process will then continue, as has been already described. If preferred, the operation might commence with full-grown leeches, the order being somewhat changed, but the principal being the same. 15

In witness whereof, I, the said Nathaniel Johnston, have hereunto set my hand and seal, this Twenty-ninth day of May, in the year of our Lord One thousand eight hundred and fifty-five.

NATH^L JOHNSTON. (L.S.)

Witness,

L. V. CLOSE, of Northallerton,
now resident in Bordeaux.

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Printers to the Queen's most Excellent Majesty. 1855.

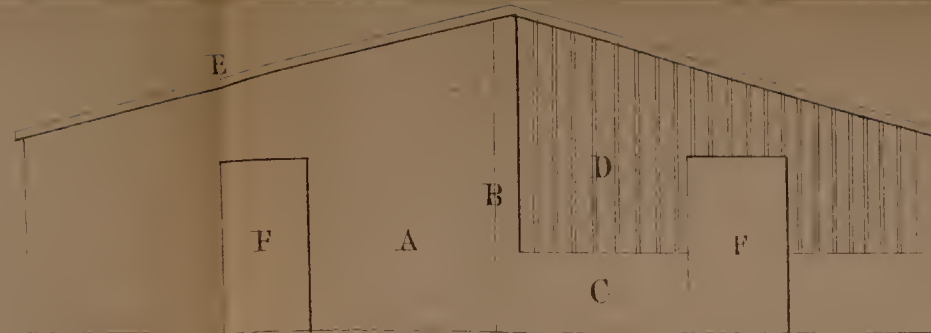


FIG. 1.

FIG. 2.

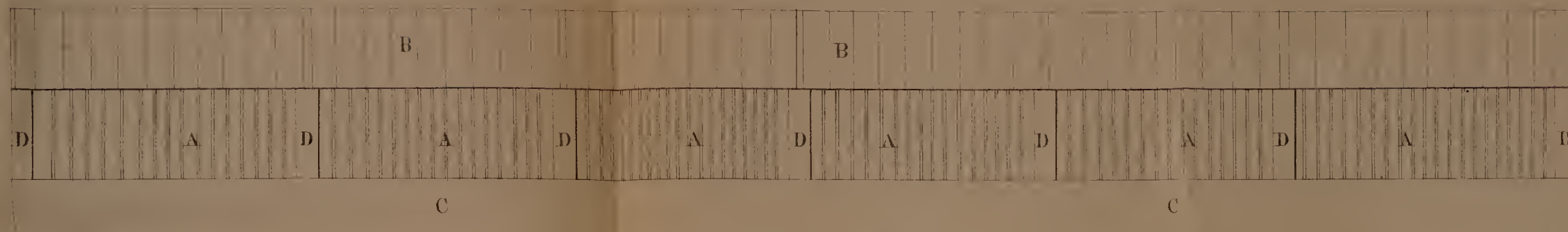
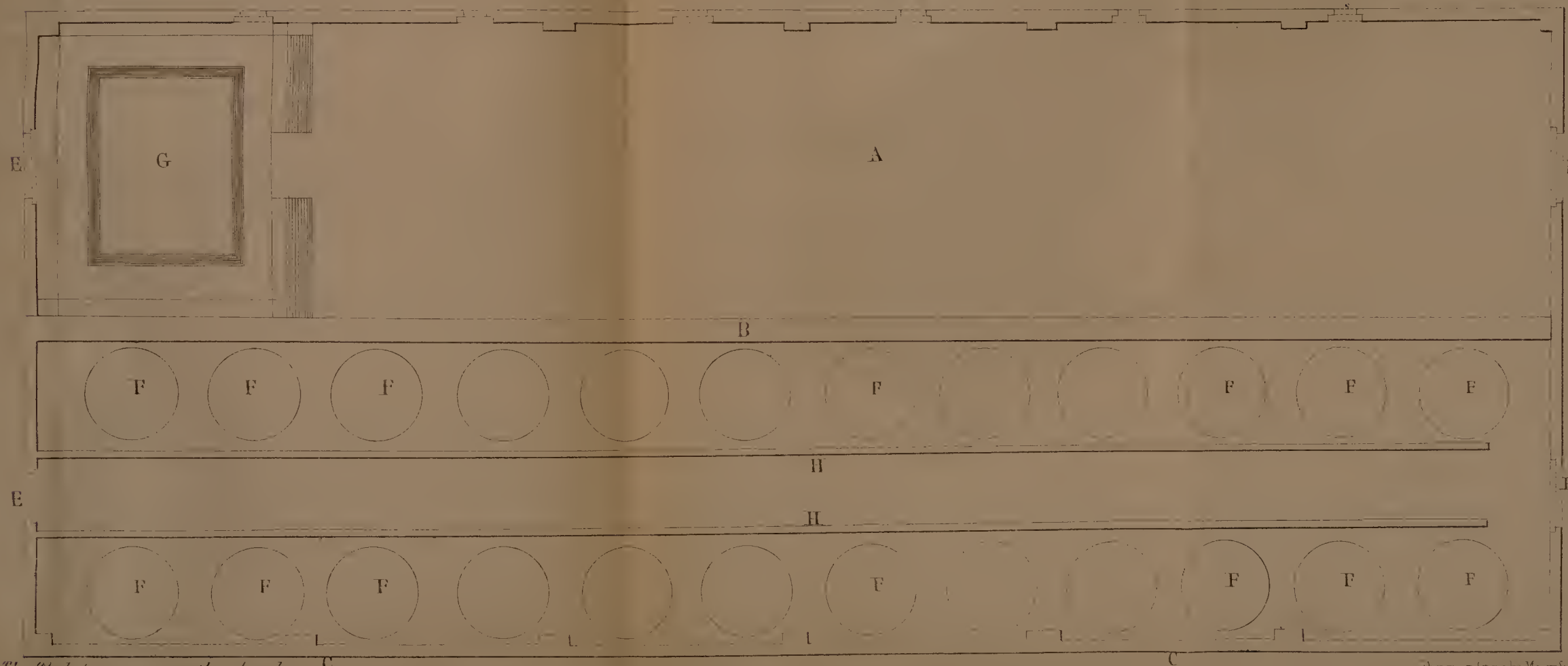


FIG. 3.



The filed drawing is partly colored:

Drawn on Stone by M. & S. Smith

